

## ABSTRACT OF THE DISCLOSURE

A method is provided for the preparation of nanoscale particle arrays having highly uniform crystals of metal, semiconductor or insulator materials grown in nanopores in the surface of a substrate, wherein the method uses pulse-reverse electrodeposition of metals with a rectangular or square waveform in order to generate high homogeneity of crystals and high in-plane or out-of-plane anisotropy in a controlled manner, enabling the creation of a variety of devices, including but not limited to high density storage media.

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